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APPENDIX A – TRAFFIC ANALYSIS SUMMARY

SUMMARY OF ANALYSIS

An operational analysis was conducted along the State Route 126 corridor from Center Street (L.M. 3.72) to the I-81 interchange (L.M. 12.12) for the existing conditions (No Build), the two (2) Build alternatives (Alternative A and Alternative B) described in the State Route 126 Corridor Improvement Project Draft Environmental Impact Statement (DEIS), and a modified version of Alternative B (Preferred Alternative) for the Design Year 2037.

The operational analysis utilized traffic projections provided by TDOT on 11/5/12. The analysis for all segments was conducted using the Highway Capacity Software (HCS) 2010 software. Each alternative was subdivided in smaller segments and analyzed using the assumptions and methodologies presented in the **Analysis Methodology** section. The resulting Level of Service (LOS) for all segments analyzed for each alternative is presented in **Table 1**. A more detailed breakdown of the analysis results and calculations for each alternative can be found in the **Appendix**.

TABLE 1: LEVEL OF SERVICE (LOS) SUMMARY

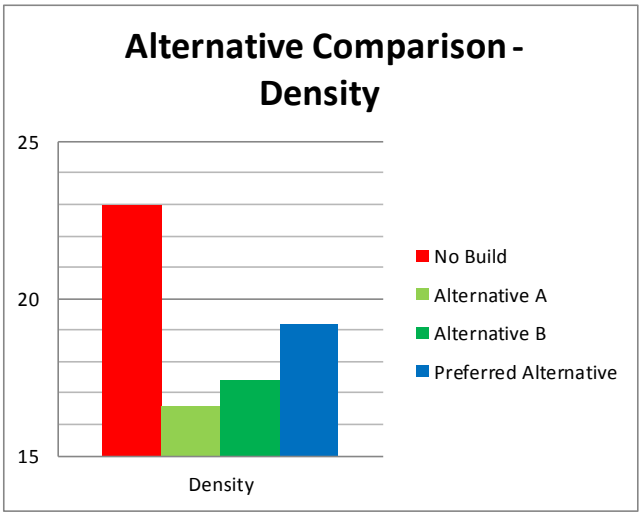
Segment	Alternative				Range
	No Build	Alt A	Alt B	Preferred Alt	
	LOS	LOS	LOS	LOS	
1a	B	B	B	B	Center to SR 93
1b	C	B	B	B	SR 93 to Hawthorne
2a	B/B[1]	B	B	B	Hawthorn to Harbor Chapel
2b	A/B[1]	A	A	A	Harbor Chapel to Past Harbor Chapel
3	B	A	A	A/A[1]	Past Harbor Chapel to Past Old Stage
4	E	A	A	E	Past Old Stage to Lemay
5	E	A	E	E	Lemay to Cooks Valley
6	E	E	E	E	Cooks Valley to Island
7	E	E	E	E	Island to Fall Creek
8	E	E	E	E	Fall Creek to Hill
9	E	E	E	E	Hill to Harrtown
10	E	D	D	D	Harrtown to Carolina Pottery
11	A	A	A	A	Carolina Pottery to I-81

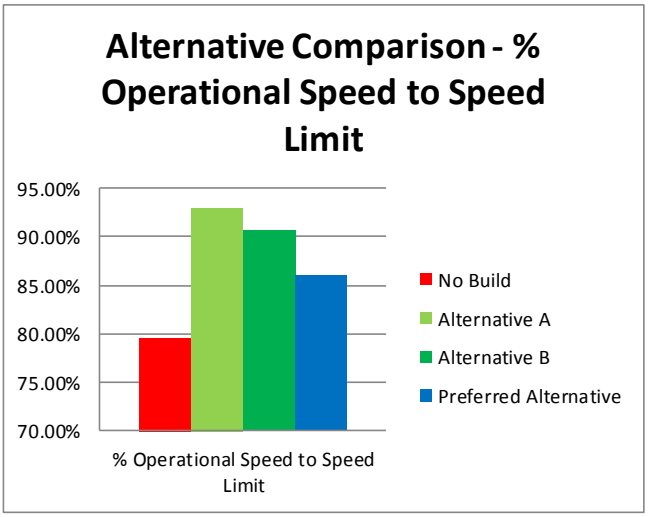
[1]Analysis segment geometry is asymmetrical. LOS given for both eastbound and westbound lanes, respectively.

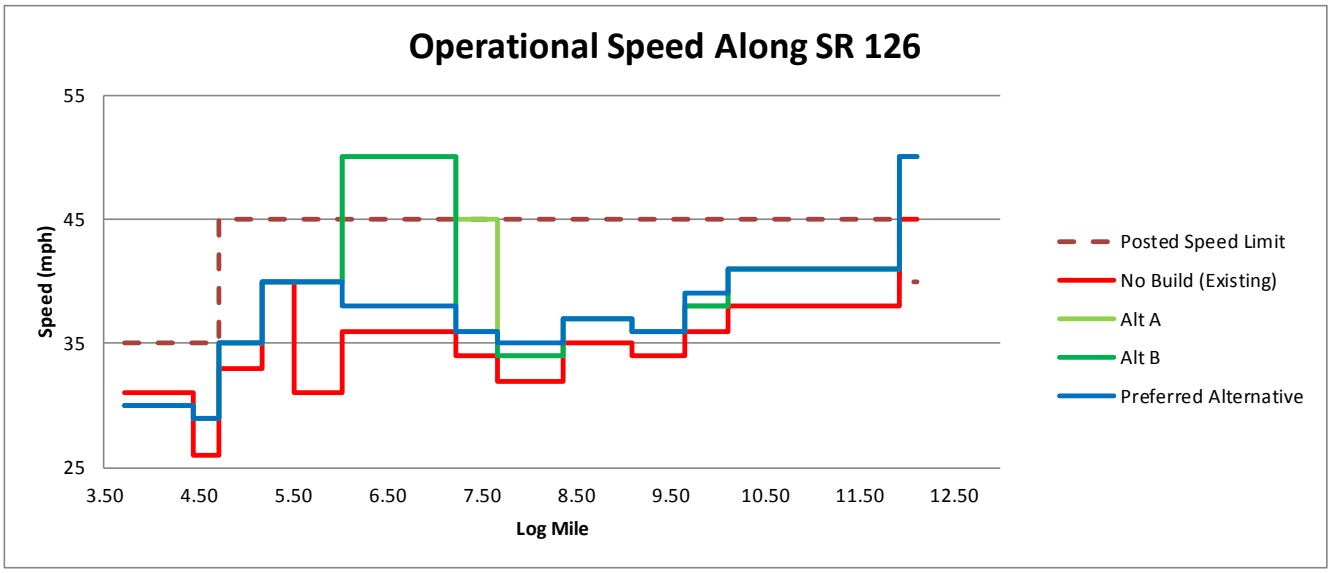
Aside from LOS, the density and operational speed of the analysis segments were used to further compare the alternatives. A side by side comparison of the analysis results can be found in **Figure 1**. The graphs depicting the density and percent operational speed to the speed limit represent overall values and were developed using a weighted average with respect to segment length versus total length of the study corridor. As shown by the comparison, all build alternatives analyzed showed an improvement in both the operational speed and density over that of the No Build during the Design Year.

FIGURE 1: COMPARISON OF ALTERNATIVES

Comparison of Alternatives







ANALYSIS METHODOLOGY

SEGMENT SELECTION

The division between the analysis segments was based on the following:

- Change in roadway typical section
- Change in traffic volume

In some cases, there existed a traffic change where a small portion of the analysis segment would have different volumes. In this instance, the segment was not broken up into smaller pieces and the highest traffic volume along the subject segment was used in the analysis.

TRAFFIC VOLUMES

Projected Average Daily Traffic (ADT) and Percent Trucks along State Route 126 for 2017 and 2037 were provided by TDOT's Project Planning Division. The Design Hourly Volume (DHV) and directional splits for the analysis were calculated using a K factor and Directional Distribution Factor taken from the Tennessee Roadway Information Management System (TRIMS) and confirmed by TDOT.

MODULE SELECTION

The operational analysis along the State Route 126 corridor was conducted using HCS 2010 software. The software uses methodologies set forth by the 2010 Highway Capacity Manual (HCM). The three (3) modules used in the development of the analysis are the following: Streets, Two Lane, and Multilane.

STREETS ANALYSIS

The Streets module was used with segments identified as having interrupted flow conditions. According to the 2010 HCM (page 17-6), a roadway segment with boundary points within two (2) miles of an existing signalized intersection is considered to operate under interrupted flow conditions. Using this criterion, the Streets Module was applied from the beginning of the project through Old Stage Road, which coincides with the current Kingsport City Limits.

Existing lane widths were utilized for the No Build analysis. Lane widths as proposed are used for all Build alternatives. The numbers of access points were estimated by an actual count taken from aerial photography and GIS property information.

Streets Analysis Assumptions:

- The delay due to turning vehicles was developed using HCM 2010 Exhibit 17-13. This exhibit provides a through vehicle delay due to turning vehicles in seconds per vehicle and is dependent on the midsegment traffic volume and number of lanes. A fifty (50) percent adjustment was applied to the delay times due to the presence of a turn lane as recommended in the 2010 HCM page 17-35, paragraph 3.

- As intersection turning movement data was not available, the volume distribution for access point intersections was developed using the suggested proportions of the major roadway's directional volume, as shown in HCM 2010 Exhibit 17-25. The use of actual turning movement counts at minor roadway intersections, if they were available, would have an insignificant effect on the existing level of service and would not be applicable to the design year analysis. Minor roadways through movements were not estimated as they are not needed for the HCM 2010 Streets' automobile analysis.

TWO LANE/MULTILANE ANALYSIS

Segments not meeting the interrupted flow criteria were analyzed with either the Two Lane or Multilane module depending on the typical section of the segment. All segments from Old Stage Road to the end of the project at I-81 were analyzed as uninterrupted flow.

Existing lane widths were utilized for the No Build analysis. Lane widths as proposed in the DEIS were used for all Build alternatives. The numbers of access points were estimated by an actual count taken from aerial photography and GIS property information.

Two Lane Analysis Assumptions:

- Rolling terrain was assumed for all segments.
- The analysis utilized an estimated Base Free Flow Speed (BFFS) for each segment of the build alternatives. For the two lane analysis, the estimated BFFS was calculated using guidance given in the 2010 HCM. As shown in the HCM 2010 Exhibit 15-5, the estimated BFFS of a two lane analysis segment was calculated by adding ten (10) mph to the speed limit of the segment.
    - For the build alternatives, the design speed of the analysis segment was assumed to be the future speed limit for analysis.
    - For the No Build Alternative, the current posted speed was used to develop a BFFS with one exception. The BFFS for the analysis of State Route 126 from Old Stage Road to Carolina Pottery Road was based on a reduction in speed limit request by the Department of Safety in July 2012.
- One hundred (100) percent no passing zone was assumed for all two (2) lane segments with a two way left turn lane based on guidance given in the 2010 HCM page 15-63, paragraph 2.
- The percent no passing zone for two lane segments with no two way left turn lane was determined based on the existing conditions, which is one hundred (100) percent no passing.
- All segments analyzed were classified as Class I and use percent time spent following (PTSF) and operational speed as the MOE for LOS determination. (Class III was considered as an alternative analysis. Further discussion on using Class III Highway in the analysis is provided in the **Two Lane Segments Analyzed as a Class III Highway** section.)

Multilane Analysis Assumptions:

- Rolling terrain was assumed for all segments.
- For the multilane analysis segments, the estimated BFFS was calculated using guidance given in the 2010 HCM. For multilane analysis segments, the estimated BFFS was estimated by adding seven (7) mph to the speed limit of the segment as suggested in 2010 HCM page 14-11, paragraph 2. For the build alternatives, the design speed of the analysis segment was assumed to be the future speed limit for analysis.

TRAFFIC ANALYSIS

Each alternative was analyzed for the base year (2017) and design year (2037) traffic volumes provided by TDOT using the 2010 Highway Capacity Software and the methodologies discussed in this report. The details of each analysis and its results are tabulated in the following pages as summarized below.

- No-Build Analysis Summary
- No-Build 2017 Analysis Details
- No-Build 2037 Analysis Details
- Preferred Alternative Analysis Summary
- Preferred Alternative 2017 Analysis Details
- Preferred Alternative 2037 Analysis Details
- Build Alternative A Analysis Summary
- Build Alternative A 2017 Analysis Details
- Build Alternative A 2037 Analysis Details
- Build Alternative B Analysis Summary
- Build Alternative B 2017 Analysis Details
- Build Alternative B 2037 Analysis Details

No-Build LOS

ID	From		To		Dist.	Cross Section	Speed Limit	2017				2037			
	L.M.	Desc.	L.M.	Desc.				AADT	LOS	Speed	Density	AADT	LOS	Speed	Density
1a	3.72	Center St.	4.44	SR 93	0.72	4-Lanes with No Median and Narrow Shoulders	35	14,680	B	32	16.5	18,580	B	31	21.2
1b	4.44	SR 93	4.71	Hawthorne St.	0.27	4-Lanes with a Raised Grass Median and Wide Shoulders	35	16,100	C	25	22.6	20,380	C	26	28.5
2a	4.71	Hawthorne St.	5.18	Harbor Chapel Rd.	0.47	2-Lanes Eastbound, 1-Lane Westbound with No Median and Narrow	45	15,630	B	34	32.9	20,190	B	33	43.4
2b	5.18	Harbor Chapel Rd.	5.52	Past Harbor Chapel	0.34	2-Lanes Eastbound, 1-Lane Westbound with No Median and Narrow	45	10,030	A	41	17.7	12,980	A	41	22.7
3	5.52	Past Harbor Chapel	6.02	Past Old Stage Rd.	0.5	2-Lanes with TWLTL and Narrow Shoulders	45	10,030	B	32	22.2	12,980	B	31	30.2
4	6.02	Past Old Stage Rd.	7.22	Lemay Rd.	1.2	2-Lanes with No Median and Narrow Shoulders	45	7,680	E	38	17.4	10,370	E	36	23.7
5	7.22	Lemay Rd.	7.66	Cooks Valley Rd.	0.44	2-Lanes with No Median and Narrow Shoulders	45	7,680	E	36	18.5	10,370	E	34	25.3
6	7.66	Cooks Valley Rd.	8.37	Island Rd.	0.71	2-Lanes with No Median and Narrow Shoulders	45	9,570	E	34	23.0	12,350	E	32	30.9
7	8.37	Island Rd.	9.10	Fall Creek Rd.	0.73	2-Lanes with No Median and Narrow Shoulders	45	7,510	E	36	18.1	8,410	E	35	20.1
8	9.10	Fall Creek Rd.	9.65	Hill Rd.	0.55	2-Lanes with No Median and Narrow Shoulders	45	8,440	E	35	20.1	9,960	E	34	24.4
9	9.65	Hill Rd.	10.12	Harrtown Rd.	0.47	2-Lanes with No Median and Narrow Shoulders	45	6,370	E	36	15.5	7,010	E	36	16.8
10	10.12	Harrtown Rd.	11.92	Carolina Pottery Rd.	1.8	2-Lanes with No Median and Narrow Shoulders	45	6,870	E	39	15.4	6,980	E	38	15.7
11	11.92	Carolina Pottery Rd.	12.12	I-81	0.2	4-Lanes with a Raised Grass Median and Wide Shoulders	40	6,870	A	45	6.6	6,980	A	45	6.7
				Σ =	**8.4**	**Weighted Average =**	**44**			**36**	**18.6**			**35**	**23.0**

2017 No-Build LOS Calculation Data

										For Streets Analysis				For Multi-Lane Analysis				For Two-Lane Analysis			
ID	AADT	K	D	2-Way DHV	DDHV	Truck %	Shoulder Width	% No Passing	Access Points	Rate	Speed	PFFS	Density	Flow Rate	Diff Speed	Speed	Density	Flow Rate	Speed	PTSF	Density
1a	14680	0.11	0.65	1610	1050	3%	1	n/a	6/6	1050	31.9	77.3	16.5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1b	16100	0.11	0.65	1770	1150	3%	8	n/a	4/5	1150	25.4	62.2	22.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2a	15630	0.11	0.65	1720	1120	3%	2	n/a	6/6	1120	34	74.23	32.9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2b	10030	0.11	0.65	1100	720	4%	2	n/a	0/0	720	40.73	87.12	17.7	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3	10030	0.11	0.65	1100	720	4%	2	n/a	3/2	720	32.48	71.41	22.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4	7680	0.11	0.65	840	550	6%	2	n/a	6/4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	656	37.7	78.2	17.4
5	7680	0.11	0.65	840	550	6%	2	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	656	35.5	78.2	18.5
6	9570	0.11	0.65	1050	680	6%	2	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	786	34.2	81.7	23.0
7	7510	0.11	0.65	830	540	6%	2	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	644	35.6	78.2	18.1
8	8440	0.11	0.65	930	600	6%	2	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	705	35.0	80.1	20.1
9	6370	0.11	0.65	700	460	6%	2	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	564	36.3	72.6	15.5
10	6870	0.11	0.65	760	490	6%	2	100	14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	594	38.5	75.7	15.4
11	6870	0.11	0.65	760	490	6%	12	n/a	5/15	n/a	n/a	n/a	n/a	296	2	45	6.6	n/a	n/a	n/a	n/a

2037 No-Build LOS Calculation Data

										For Streets Analysis				For Multi-Lane Analysis				For Two-Lane Analysis			
ID	AADT	K	D	2-Way DHV	DDHV	Truck %	Shoulder Width	% No Passing	Access Points	Rate	Speed	PFFS	Density	Flow Rate (Calc)	Diff Speed	Speed	Density	Flow Rate (Calc)	Speed	PTSF	Density
1a	18,580	0.11	0.65	2040	1330	3%	1	n/a	6/6	1330	31.4	75.9	21.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1b	20,380	0.11	0.65	2240	1460	3%	8	n/a	4/5	1460	25.65	63	28.5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2a	20,190	0.11	0.65	2220	1440	3%	2	n/a	6/6	1440	33.2	72.6	43.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2b	12,980	0.11	0.65	1430	930	4%	2	n/a	0/0	930	41	87.7	22.7	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3	12,980	0.11	0.65	1430	930	4%	2	n/a	3/2	930	30.8	67.8	30.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4	10,370	0.11	0.65	1140	740	6%	2	n/a	6/4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	850	35.9	84.5	23.7
5	10,370	0.11	0.65	1140	740	6%	2	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	850	33.6	84.5	25.3
6	12,350	0.11	0.65	1360	880	6%	2	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	996	32.2	88.0	30.9
7	8,410	0.11	0.65	930	600	6%	2	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	705	35.0	80.1	20.1
8	9,960	0.11	0.65	1100	720	6%	2	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	827	33.9	83.5	24.4
9	7,010	0.11	0.65	770	500	6%	2	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	603	35.9	75.9	16.8
10	6,980	0.11	0.65	770	500	6%	2	100	14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	603	38.4	75.9	15.7
11	6,980	0.11	0.65	770	500	6%	12	n/a	5/15	n/a	n/a	n/a	n/a	302	2	45	6.7	n/a	n/a	n/a	n/a

Preferred Alternative LOS

ID	From		To		Dist.	Cross Section	Speed Limit	2017				2037			
	L.M.	Desc.	L.M.	Desc.				AADT	LOS	Speed	Density	AADT	LOS	Speed	Density
1a	3.72	Center St.	4.44	SR 93	0.72	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	14,680	B	31	17.2	18,580	B	30	22.4
1b	4.44	SR 93	4.71	Haw-thorne St.	0.27	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	16,100	B	30	19.4	20,380	B	29	25.3
2	4.71	Haw-thorne St.	5.18	Harbor Chapel Rd.	0.47	4-Lanes with a TWLTL and 4 Ft. Shoulders	35	15,630	A	35	15.8	20,190	B	35	20.6
3	5.18	Harbor Chapel Rd.	6.02	Past Old Stage Rd.	0.84	2-Lanes w/ EB Truck Climbing Lane and 10 Ft. Shoulders	45	10,030	A	40	9.0	12,980	A	40	11.7
4	6.02	Past Old Stage Rd.	7.22	Past Lemay Rd.	1.2	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	7,680	D	40	16.3	10,370	E	38	22.1
5	7.22	Past Lemay Rd.	7.66	Cooks Valley Rd.	0.44	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	7,680	E	38	17.2	10,370	E	36	23.5
6	7.66	Cooks Valley Rd.	8.37	Island Rd.	0.71	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	9,570	E	37	21.4	12,350	E	35	28.6
7	8.37	Island Rd.	9.10	Fall Creek Rd.	0.73	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	7,510	E	38	17.0	8,410	E	37	19.0
8	9.10	Fall Creek Rd.	9.65	Hill Rd.	0.55	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	8,440	E	38	18.8	9,960	E	36	22.7
9	9.65	Hill Rd.	10.12	Harrtown Rd.	0.47	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	6,370	E	39	14.5	7,010	E	39	15.7
10	10.12	Harrtown Rd.	11.92	Carolina Pottery Rd.	1.8	2-Lanes with No Median and 10 Ft. Shoulders	45	6,870	D	41	14.5	6,980	D	41	14.7
11	11.92	Carolina Pottery Rd.	12.12	I-81	0.2	4-Lanes with a Raised Grass Median and 12 Ft. Shoulders	45	6,870	A	50	5.9	6,980	A	50	6.0
				Σ =	**8.40**	**Weighted Average =**	**43**			**38**	**15.7**			**37**	**19.2**

2017 Preferred Alternative Calculation Data

										For Streets Analysis				For Multi-Lane Analysis				For Two-Lane Analysis			
ID	AADT	K	D	2-Way DHV	DDHV	Truck %	Shoulder Width	% No Passing	Access Points	Rate	Speed	PFFS	Density	Flow Rate	Diff Speed	Speed	Density	Flow Rate	Speed	PTSF	Density
1a	14,680	0.11	0.65	1610	1050	3%	4	n/a	8/8	1050	30.5	78.4	17.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1b	16,100	0.11	0.65	1770	1150	3%	4	n/a	4/3	1150	29.6	78.5	19.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	15,630	0.11	0.65	1720	1120	3%	4	n/a	2/1	1120	35.4	85.9	15.8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3	10,030	0.11	0.65	1100	720	4%	10	n/a	1/0	720	39.9	86.4	9.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4	7,680	0.11	0.65	840	550	6%	6	n/a	15	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	656	40.3	78.2	16.3
5	7,680	0.11	0.65	840	550	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	656	38.1	78.2	17.2
6	9,570	0.11	0.65	1050	680	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	786	36.8	81.7	21.4
7	7,510	0.11	0.65	830	540	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	644	37.8	78.2	17.0
8	8,440	0.11	0.65	930	600	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	705	37.6	80.1	18.8
9	6,370	0.11	0.65	700	460	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	564	38.9	72.6	14.5
10	6,870	0.11	0.65	760	490	6%	10	100	14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	594	41.1	75.7	14.5
11	6,870	0.11	0.65	760	490	6%	12	n/a	5/15	n/a	n/a	n/a	n/a	296	2	50	5.9	n/a	n/a	n/a	n/a

2037 Preferred Alternative LOS Calculation Data

										For Streets Analysis				For Multi-Lane Analysis				For Two-Lane Analysis			
ID	AADT	K	D	2-Way DHV	DDHV	Truck %	Shoulder Width	% No Passing	Access Points	Rate	Speed	PFFS	Density	Flow Rate (Calc)	Diff Speed	Speed	Density	Flow Rate (Calc)	Speed	PTSF	Density
1a	18,580	0.11	0.65	2040	1330	3%	4	n/a	8/8	1330	29.7	76.5	22.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1b	20,380	0.11	0.65	2240	1460	3%	4	n/a	4/3	1460	28.8	76.4	25.3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	20,190	0.11	0.65	2220	1440	3%	4	n/a	2/1	1440	34.9	84.8	20.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3	12,980	0.11	0.65	1430	930	4%	10	n/a	1/0	930	39.6	85.6	11.7	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4	10,370	0.11	0.65	1140	740	6%	6	n/a	15	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	850	38.4	84.5	22.1
5	10,370	0.11	0.65	1140	740	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	850	36.2	84.5	23.5
6	12,350	0.11	0.65	1360	880	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	996	34.8	88.0	28.6
7	8,410	0.11	0.65	930	600	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	705	37.2	80.1	19.0
8	9,960	0.11	0.65	1100	720	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	827	36.4	83.5	22.7
9	7,010	0.11	0.65	770	500	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	603	38.5	75.9	15.7
10	6,980	0.11	0.65	770	500	6%	10	100	14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	603	41.0	75.9	14.7
11	6,980	0.11	0.65	770	500	6%	12	n/a	5/15	n/a	n/a	n/a	n/a	302	2	50	6.0	n/a	n/a	n/a	n/a

Build Alternative A LOS

ID	From		To		Dist.	Cross Section	Speed Limit	2017				2037			
	L.M.	Desc.	L.M.	Desc.				AADT	LOS	Speed	Density	AADT	LOS	Speed	Density
1a	3.72	Center St.	4.44	SR 93	0.72	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	14,680	B	31	17.2	18,580	B	30	22.4
1b	4.44	SR 93	4.71	Haw-thorne St.	0.27	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	16,100	B	30	19.4	20,380	B	29	25.3
2	4.71	Haw-thorne St.	5.18	Harbor Chapel Rd.	0.47	4-Lanes with a TWLTL and 4 Ft. Shoulders	35	15,630	A	35	15.8	20,190	B	35	20.6
3	5.18	Harbor Chapel Rd.	6.02	Past Old Stage Rd.	0.84	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	45	10,030	A	41	8.8	12,980	A	40	11.6
4	6.02	Past Old Stage Rd.	7.22	Past Lemay Rd.	1.2	4-Lanes with a Raised Grass Median and 8 Ft. Shoulders	45	7,680	A	50	6.7	10,370	A	50	9.0
5	7.22	Past Lemay Rd.	7.66	Cooks Valley Rd.	0.44	4-Lanes with a Raised Grass Median and 8 Ft. Shoulders	45	7,680	A	45	7.4	10,370	A	45	10.0
6	7.66	Cooks Valley Rd.	8.37	Island Rd.	0.71	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	9,570	E	37	21.4	12,350	E	34	29.0
7	8.37	Island Rd.	9.10	Fall Creek Rd.	0.73	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	7,510	E	38	17.0	8,410	E	37	19.0
8	9.10	Fall Creek Rd.	9.65	Hill Rd.	0.55	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	8,440	E	38	18.8	9,960	E	36	23.0
9	9.65	Hill Rd.	10.12	Harrtown Rd.	0.47	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	6,370	E	39	14.5	7,010	E	38	15.8
10	10.12	Harrtown Rd.	11.92	Carolina Pottery Rd.	1.8	2-Lanes with No Median and 10 Ft. Shoulders	45	6,870	D	41	14.5	6,980	D	41	14.7
11	11.92	Carolina Pottery Rd.	12.12	I-81	0.2	4-Lanes with a Raised Grass Median and 12 Ft. Shoulders	45	6,870	A	50	5.9	6,980	A	50	6.0
				Σ =	**8.4**	**Weighted Average =**	**43**			**40**	**13.77**			**40**	**16.6**

2017 Build Alternative A LOS Calculation Data

ID	AADT	K	D	2-Way DHV	DDHV	Truck %	Shoulder Width	% No Passing	Access Points	For Streets Analysis				For Multi-Lane Analysis				For Two-Lane Analysis			
										Rate	Speed	PFFS	Density	Flow Rate	Diff Speed	Speed	Density	Flow Rate	Speed	PTSF	Density
1a	14680	0.11	0.65	1610	1050	3%	4	n/a	8/8	1050	30.5	78.4	17.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1b	16100	0.11	0.65	1770	1150	3%	4	n/a	4/3	1150	29.6	78.5	19.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	15630	0.11	0.65	1720	1120	3%	4	n/a	2/1	1120	35.4	85.9	15.8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3	10030	0.11	0.65	1100	720	4%	4	n/a	1/0	720	41.1	86.9	8.8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4	7680	0.11	0.65	840	550	6%	8	n/a	4/1	n/a	n/a	n/a	n/a	333	2	50	6.7	n/a	n/a	n/a	n/a
5	7680	0.11	0.65	840	550	6%	8	n/a	12/12	n/a	n/a	n/a	n/a	333	7	45	7.4	n/a	n/a	n/a	n/a
6	9570	0.11	0.65	1050	680	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	786	36.8	81.7	21.4
7	7510	0.11	0.65	830	540	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	644	37.8	78.2	17.0
8	8440	0.11	0.65	930	600	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	705	37.6	80.1	18.8
9	6370	0.11	0.65	700	460	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	564	38.9	72.6	14.5
10	6870	0.11	0.65	760	490	6%	10	100	14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	594	41.1	75.7	14.5
11	6870	0.11	0.65	760	490	6%	12	n/a	5/15	n/a	n/a	n/a	n/a	296	2	50	5.9	n/a	n/a	n/a	n/a

2037 Build Alternative A LOS Calculation Data

ID	AADT	K	D	2-Way DHV	DDHV	Truck %	Shoulder Width	% No Passing	Access Points	For Streets Analysis				For Multi-Lane Analysis				For Two-Lane Analysis			
										Rate	Speed	PFFS	Density	Flow Rate (Calc)	Diff Speed	Speed	Density	Flow Rate (Calc)	Speed	PTSF	Density
1a	18,580	0.11	0.65	2040	1330	3%	4	n/a	8/8	1330	29.7	76.5	22.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1b	20,380	0.11	0.65	2240	1460	3%	4	n/a	4/3	1460	28.8	76.4	25.3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	20,190	0.11	0.65	2220	1440	3%	4	n/a	2/1	1440	34.9	84.8	20.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3	12,980	0.11	0.65	1430	930	4%	4	n/a	1/0	930	40.2	85.2	11.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4	10,370	0.11	0.65	1140	740	6%	8	n/a	4/1	n/a	n/a	n/a	n/a	448	2	50	9	n/a	n/a	n/a	n/a
5	10,370	0.11	0.65	1140	740	6%	8	n/a	12/12	n/a	n/a	n/a	n/a	448	7	45	10	n/a	n/a	n/a	n/a
6	12,350	0.11	0.65	1360	880	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	996	34.4	88.0	29.0
7	8,410	0.11	0.65	930	600	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	705	37.2	80.1	19.0
8	9,960	0.11	0.65	1100	720	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	827	36.0	83.5	23.0
9	7,010	0.11	0.65	770	500	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	603	38.1	75.9	15.8
10	6,980	0.11	0.65	770	500	6%	10	100	14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	603	41.0	75.9	14.7
11	6,980	0.11	0.65	770	500	6%	12	n/a	5/15	n/a	n/a	n/a	n/a	302	2	50	6.0	n/a	n/a	n/a	n/a

Build Alternative B LOS

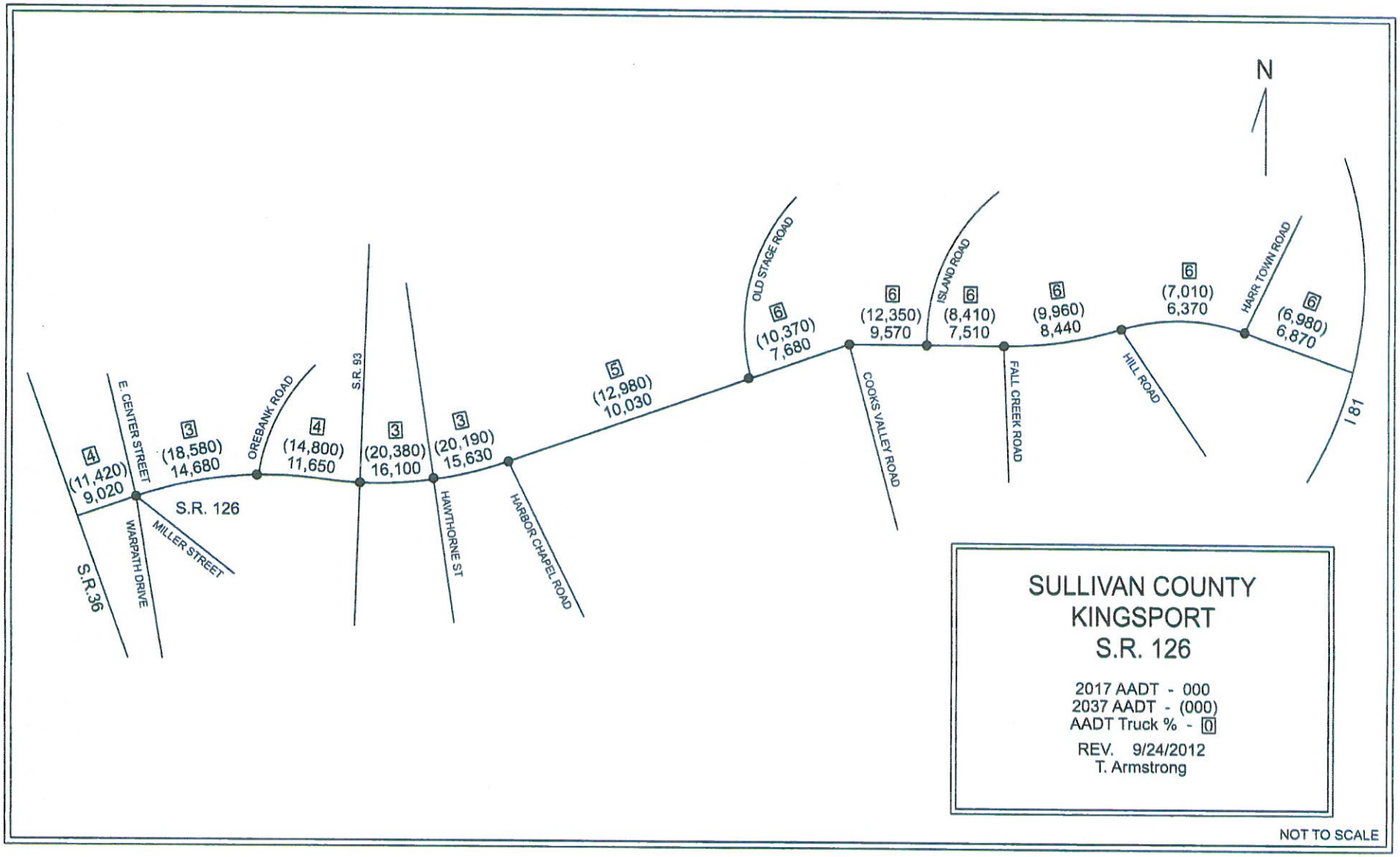
ID	From		To		Dist.	Cross Section	Speed Limit	2017				2037			
	L.M.	Desc.	L.M.	Desc.				AADT	LOS	Speed	Density	AADT	LOS	Speed	Density
1a	3.72	Center St.	4.44	SR 93	0.72	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	14,680	B	31	17.2	18,580	B	30	22.4
1b	4.44	SR 93	4.71	Haw-thorne St.	0.27	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	35	16,100	B	30	19.4	20,380	B	29	25.3
2	4.71	Haw-thorne St.	5.18	Harbor Chapel Rd.	0.47	4-Lanes with a TWLTL and 4 Ft. Shoulders	35	15,630	A	35	15.8	20,190	B	35	20.6
3	5.18	Harbor Chapel Rd.	6.02	Past Old Stage Rd.	0.84	4-Lanes with a Raised Grass Median and 4 Ft. Shoulders	45	10,030	A	41	8.8	12,980	A	40	11.6
4	6.02	Past Old Stage Rd.	7.22	Past Lemay Rd.	1.2	4-Lanes with a Raised Grass Median and 8 Ft. Shoulders	45	7,680	A	50	6.7	10,370	A	50	9.0
5	7.22	Past Lemay Rd.	7.66	Cooks Valley Rd.	0.44	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	7,680	E	38	17.2	10,370	E	36	23.7
6	7.66	Cooks Valley Rd.	8.37	Island Rd.	0.71	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	9,570	E	37	21.4	12,350	E	34	29.0
7	8.37	Island Rd.	9.10	Fall Creek Rd.	0.73	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	7,510	E	38	17.0	8,410	E	37	19.0
8	9.10	Fall Creek Rd.	9.65	Hill Rd.	0.55	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	8,440	E	38	18.8	9,960	E	36	23.0
9	9.65	Hill Rd.	10.12	Harrtown Rd.	0.47	2-Lanes with a TWLTL and 6 Ft. Shoulders	45	6,370	E	39	14.5	7,010	E	38	15.8
10	10.12	Harrtown Rd.	11.92	Carolina Pottery Rd.	1.8	2-Lanes with No Median and 10 Ft. Shoulders	45	6,870	D	41	14.5	6,980	D	41	14.7
11	11.92	Carolina Pottery Rd.	12.12	I-81	0.2	4-Lanes with a Raised Grass Median and 12 Ft. Shoulders	45	6,870	A	50	5.9	6,980	A	50	6.0
				Σ =	**8.4**	**Weighted Average =**	**43**			**40**	**14.3**			**39**	**17.4**

2017 Build Alternative B LOS Calculation Data

										For Streets Analysis				For Multi-Lane Analysis				For Two-Lane Analysis			
ID	AADT	K	D	2-Way DHV	DDHV	Truck %	Shoulder Width	% No Passing	Access Points	Rate	Speed	PFFS	Density	Flow Rate	Diff Speed	Speed	Density	Flow Rate	Speed	PTSF	Density
1a	14,680	0.11	0.65	1610	1050	3%	4	n/a	25	1050	30.5	78.4	17.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1b	16,100	0.11	0.65	1770	1150	3%	4	n/a	25	1150	29.6	78.5	19.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	15,630	0.11	0.65	1720	1120	3%	4	n/a	16	1120	35.4	85.9	15.8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3	10,030	0.11	0.65	1100	720	4%	8	n/a	16	720	41.1	86.9	8.8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4	7,680	0.11	0.65	840	550	6%	6	100	8	n/a	n/a	n/a	n/a	333	2	50	6.7	n/a	n/a	n/a	n/a
5	7,680	0.11	0.65	840	550	6%	10	40	8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	656	38.1	78.2	17.2
6						6%				n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	786	36.8	81.7	21.4
7						6%				n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	644	37.8	78.2	17.0
8						6%				n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	705	37.6	80.1	18.8
9						6%				n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	564	38.9	72.6	14.5
10						6%				n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	594	41.1	75.7	14.5
11	6,870	0.11	0.65	760	490	6%	12	n/a	8	n/a	n/a	n/a	n/a	296	2	50	5.9	n/a	n/a	n/a	n/a

2037 Build Alternative B LOS Calculation Data

										For Streets Analysis				For Multi-Lane Analysis				For Two-Lane Analysis			
ID	AADT	K	D	2-Way DHV	DDHV	Truck %	Shoulder Width	% No Passing	Access Points	Rate	Speed	PFFS	Density	Flow Rate (Calc)	Diff Speed	Speed	Density	Flow Rate (Calc)	Speed	PTSF	Density
1a	18,580	0.11	0.65	2040	1330	3%	4	n/a	8/8	1330	29.7	76.5	22.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1b	20,380	0.11	0.65	2240	1460	3%	4	n/a	4/3	1460	28.8	76.4	25.3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	20,190	0.11	0.65	2220	1440	3%	4	n/a	2/1	1440	34.9	84.8	20.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3	12,980	0.11	0.65	1430	930	4%	4	n/a	1/0	930	40.2	85.2	11.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4	10,370	0.11	0.65	1140	740	6%	8	n/a	4/1	n/a	n/a	n/a	n/a	448	2	50	9	n/a	n/a	n/a	n/a
5	10,370	0.11	0.65	1140	740	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	850	35.8	84.5	23.7
6	12,350	0.11	0.65	1360	880	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	996	34.4	88.0	29.0
7	8,410	0.11	0.65	930	600	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	705	37.2	80.1	19.0
8	9,960	0.11	0.65	1100	720	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	827	36.0	83.5	23.0
9	7,010	0.11	0.65	770	500	6%	6	100	24	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	603	38.1	75.9	15.8
10	6,980	0.11	0.65	770	500	6%	10	100	14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	603	41.0	75.9	14.7
11	6,980	0.11	0.65	770	500	6%	12	n/a	5/15	n/a	n/a	n/a	n/a	302	2	50	6.0	n/a	n/a	n/a	n/a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9,020
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3
(18,580)
14,680
OREBANK ROAD
4
(14,800)
11,650
S.R. 93
3
(20,380)
16,100
3
(20,190)
15,630
5
(12,980)
10,030
OLD STAGE ROAD
6
(10,370)
7,680
6
(12,350)
9,570
ISLAND ROAD
6
(8,410)
7,510
6
(9,960)
8,440
6
(7,010)
6,370
HARR TOWN ROAD
6
(6,980)
6,870
I 81
S.R. 126
S.R.36
WARPATH DRIVE
MILLER STREET
HAWTHORNE ST
HARBOR CHAPEL ROAD
COOKS VALLEY ROAD
FALL CREEK ROAD
HILL ROAD
SULLIVAN COUNTY
KINGSPORT
S.R. 126
2017 AADT - 000
2037 AADT - (000)
AADT Truck % - 0
REV. 9/24/2012
T. Armstrong
NOT TO SCALE